

## REMARKS

### **I. OVERVIEW**

Claims 1-28 are pending in present amendment. Claims 1-10 have been withdrawn from consideration. Claims 11-14, 16-20, 22-25, and 28 have been amended. Claims 29 and 30 have been added. The issues raised by the Examiner in the Non-Final Office Action of February 21, 2007 (*Office Action*) are as follows:

- Claims 11-28 stand objected to due to informalities;
- Claims 11-28 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement; and
- Claims 11 and 16 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,801,581 (*Francos*).

Applicant respectfully traverses the outstanding objections and rejections, and requests reconsideration and withdrawal in light of the amendments and remarks presented herein.

### **II. AMENDMENTS TO THE SPECIFICATION**

The title of the present application has been amended to recite "Method and Apparatus for RF Carrier Feedthrough Suppression." No new matter has been presented with this amendment, as the as the added language finds ample support throughout the Specification as originally filed. *E.g.*, *Specification* at p. 6, Ins. 7-10. Furthermore, the amended title fully complies with 37 C.F.R. § 1.72.

### **III. OBJECTIONS AND AMENDMENTS TO THE CLAIMS**

Claims 11-28 stand objected to due to informalities. *Office Action*, at p. 2. First, Applicant respectfully notes that some of the Examiner's objections are incorrect (*e.g.*, the verb "comprises" is recited in its correct form in claims 12 and 17). *See id.* Nonetheless, Applicant has amended claims 11-14, 16-20, 22-25, and 28 to correct minor typographical errors. No new matter has been added and these amendments are not intended to narrow the scope of the claims. In light of these amendments, the objections of record with respect to claims 11-28 are now overcome.

In addition, claim 11 has been amended to more clearly recite a method for suppressing carrier feedthrough, and to substitute the term “search method” with the terms “first search” and “second search,” when appropriate. No new matter has been presented with these amendments, as the as the added language finds ample support throughout the Specification as originally filed. *E.g., Specification* at p. 6, lns. 7-10; p. 9, lns. 10-16.

Claims 12 and 17 have been amended to clarify that receiver path correction signals are subtracted from a first downconverter output signals, and that transmitter path correction signals from a first upconverter input signals. No new matter has been presented with these amendments. Moreover, these amendments are not intended to narrow the scope of the claims.

Claim 13 has been amended to recite a search selected from the group consisting of a rotated binary search, an unrotated binary search, and a hybrid search. No new matter has been presented with these amendments, as the as the added language finds ample support throughout the Specification as originally filed. *E.g., Specification* at p. 14, lns. 4-11; p. 16, lns. 10-17; and p. 17, ln. 21—ln. 5.

Claims 14 and 20 have been amended to recite full-duplex operation. No new matter has been presented with these amendments, as the as the added language finds ample support throughout the Specification as originally filed. *E.g., Specification* at p. 9, lns. 4-7.

Claim 16 has been amended to recite performing, during a first mode of operation, a first calibration to determine a pair of receiver path correction signals; performing, during a second mode of operation following the first mode of operation, a second calibration to determine a pair of transmitter path correction signals using the receiver path of the quadrature modulator; and using, during a third mode of operation following the second mode of operation, the pairs of receiver path and transmitter path correction signals to suppress carrier feedthrough in the quadrature modulator. No new matter has been presented with these amendments, as the as the added language finds ample support throughout the Specification as originally filed. *E.g., Specification* at p. 8, ln. 21—p. 9, ln. 7.

#### IV. CLAIM REJECTIONS UNDER 35 U.S.C. § 112, FIRST PARAGRAPH

Claims 11-28 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement because, according to the Examiner, “[t]he claim(s) contain subject matter which was not described in the specification in such a way as to enable one skilled in the art . . . to make and/or use the invention.” *Office Action* at p. 3. Applicant traverses the rejection and asserts that these claims are allowable for at least the reasons stated below.

When basing a rejection on the failure of the applicant’s disclosure to meet the enablement provisions of the first paragraph of 35 U.S.C. 112, USPTO personnel must establish on the record a reasonable basis for questioning the adequacy of the disclosure to enable a person of ordinary skill in the art to make and use the claimed invention without resorting to undue experimentation. *See In re Brown*, 477 F.2d 946, 177 USPQ 691 (CCPA 1973); *In re Ghiron*, 442 F.2d 985, 169 USPQ 723 (CCPA 1971). Once USPTO personnel have advanced a reasonable basis for questioning the adequacy of the disclosure, it becomes incumbent on the applicant to rebut that challenge and factually demonstrate that his or her application disclosure is in fact sufficient. *See In re Doyle*, 482 F.2d 1385, 1392, 179 USPQ 227, 232 (CCPA 1973); *In re Scarbrough*, 500 F.2d 560, 566, 182 USPQ 298, 302 (CCPA 1974); *In re Ghiron*, *supra*.

M.P.E.P. § 2161.01(III) (emphasis maintained). In this case, the Examiner has not provided a ***reasonable basis*** for questioning the adequacy of the disclosure, and Applicant respectfully submits that the burden of showing that the claims are enabled has not shifted to Applicant. *See Office Action* at p. 4.

In an effort to expedite prosecution of the present application, however, Applicant asserts that claims 11, 16, 22 are fully supported by the specification. For example, contrary to the Examiner’s contentions, the specification clearly teaches how to use pairs of receiver and transmitter path correction signals to suppress carrier feedthrough signal in a quadrature modulator. *E.g.*, *Specification* at p. 7, ln. 6—p. 10, ln. 13; Figure 2. With respect to claims 12 and 17, the specification clearly teaches how subtract a first transmitter path correction signal from a first upconverter input signal. *E.g.*, *id.* at p. 7, lns. 6—22; Figure 2. And, with respect to claims 14 and 20, the specification also clearly teaches how operate a quadrature modulator. *E.g.*, *id.* at p. 8, ln. 21—p. 9, ln. 9.

Accordingly, Applicant respectfully requests that the Examiner withdraw the 35 U.S.C. § 112 rejection of record with respect to claims 11-28. If the Examiner maintains the rejection, Applicant respectfully request that the Examiner provide “a reasonable basis for questioning the adequacy of the disclosure to enable a person of ordinary skill in the art to make and use the claimed invention without resorting to undue experimentation.” M.P.E.P. § 2161.01(III) (emphasis maintained).

**V. CLAIM REJECTIONS UNDER 35 U.S.C. § 102(b)**

Claims 11 and 16 stand rejected under 35 U.S.C. § 102(e) as being unpatentable over *Francos*. *Office Action*, at p. 5. Applicant traverses the rejection and asserts that these claims are allowable for at least the reasons stated below.

To anticipate a claim under 35 U.S.C. § 102, a single reference must teach each and every element of the claim. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). In fact, “[t]he identical invention must be shown in as complete detail as is contained in the . . . claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989). Furthermore, for a reference to be anticipatory, “[its] elements must be arranged as required by the claim.” *In re Bond*, 910 F.2d 831 (Fed. Cir. 1990), *cited in* M.P.E.P. § 2131.

**A. Independent Claim 11**

Independent claim 11 recites, in part, “performing a first search to determine a pair of receiver path correction signals . . . .” The Examiner does not point to any particular passage of *Francos* that is believed to teach this claimed feature. *See Office Action* at pp. 5 and 6. Rather, the only portion of *Franco* relied upon by the Examiner states, in its entirety, that:

[r]eference is now made to FIG. 1, which generally illustrates elements used in transmission for both mobile communication units and the base stations with which they communicate. While FIG. 1 presents certain elements, it will be appreciated that other mobile units and base stations may or may not include all of the elements shown in FIG. 1. FIG. 1 shows a transmission path 10, a feedback path 12 and a DC offset estimator 16. The transmission path 10 generally comprises some or all of the following elements: a baseband modulator 20, a digital to analog (D/A) converter 24, an IQ modulator 28 and a power amplifier 30. Baseband modulator 20 converts an incoming bit stream into a baseband signal having I and Q components. D/A converter 24 converts the shaped digital

signal into an analog signal. IQ modulator 28 modulates the complex baseband signal into a radio frequency (RF) signal and power amplifier 30 transmits the RF signal.

Feedback path 12 comprises some or all of the following elements: an attenuator 32, an IQ demodulator 34 and an analog to digital (A/D) converter 40. Attenuator 32 receives the transmitted radio frequency and IQ demodulator 34 converts the radio frequency signal into a baseband one. Analog to digital converter 40 converts the signal into a digital one.

DC offset estimator 16 generally determines the DC offset due to IQ modulator 28 and IQ demodulator 34 from data from feedback path 12. DC offset estimator 16 typically comprises a demodulator DC offset estimator 50 and an adaptive modulator DC offset estimator 52. Through a logical switch 54 in feedback path 12, demodulator estimator 50 may receive the output  $V_f$  of analog to digital converter 40 at predefined times. Demodulator estimator 50 may estimate the DC offset due to IQ demodulator 34 and the result, a signal labeled DC\_DEMOD\_EST, may be provided to a summer 56 in feedback path 12. When logical switch 54 connects analog to digital converter 40 to summer 56, summer 56 may subtract (block 300 of FIG. 3) the estimated DC offset, DC\_DEMOD\_EST, from the output of analog to digital converter 40, thereby providing a difference signal from which most, if not all, of the DC offset due to IQ demodulator 34 has been removed.

*Francos* at col. 2, ln. 51—col. 3, ln. 24 cited in *Office Action* at p. 6. First, *Francos* does not show a receiver path. Thus, *Francos* does not teach determining a pair of receiver path correction signals, as recited in the claim. Moreover, *Francos* is completely silent with respect to performing a search to determine a pair of correction signals. In fact, several portions of *Francos* indicate that an averaging method—*not* a search method—is used. *E.g.*, *Francos* at Equations 3 and 4.

Therefore, *Francos* does not each and every element of the claim, and the identical invention is not shown in as complete detail as is contained in the claim. Accordingly, Applicant respectfully requests that the Examiner withdraw the 35 U.S.C. § 102(e) rejection of record with respect to claim 11.

B. Independent Claim 16

Independent claim 16, as amended, recites:

performing, during a first mode of operation, a first calibration to determine a pair of receiver path correction signals;

performing, during a second mode of operation following the first mode of operation, a second calibration to determine a pair of transmitter path correction signals using the receiver path of the quadrature modulator; and

using, during a third mode of operation following the second mode of operation, the pairs of receiver path and transmitter path correction signals to suppress carrier feedthrough in the quadrature modulator.

As a preliminary matter, Applicant re-asserts that *Francos* does not even show a receiver path, therefore it does not teach performing a calibration to determine a pair of receiver path correction signals, as recited in the claim. For at least the same reason, *Francos* does not teach determining a pair of transmitter path correction signals using a receiver path, as also recited in the claim. Additionally, *Franco* is completely silent regarding the three modes of operation performed in the particular order recited claim 16.

Therefore, *Francos* does not each and every element of the claim, and the identical invention is not shown in as complete detail as is contained in the claim. Accordingly, Applicant respectfully requests that the Examiner withdraw the 35 U.S.C. § 102(e) rejection of record with respect to claim 16.

C. Claims 12-15 and 17-28

Claims 12-15 and 17-28 do not stand rejected over any reference of record. If the Examiner later decides to reject these claims based upon one of more references, Applicant respectfully requests that the Examiner set forth the grounds for rejection in the form of a non-final office action so that Applicant may have a full and fair opportunity to explore the patentability of all claims. See M.P.E.P. §§ 706 and 707.


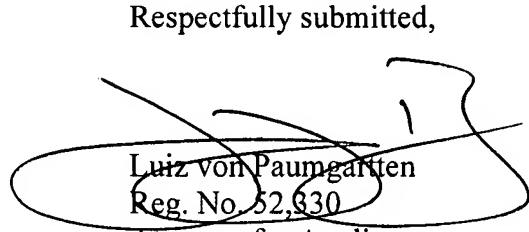
VI. NEW CLAIMS

Claims 29 and 30 are newly presented. No new matter has been added as the language of these claims finds ample support throughout the Specification as originally filed. *E.g.*, *Specification* at p. 13, ln. 17—p. 14, ln. 3. Applicant asserts that these claims are allowable, at least, due to their dependencies with respect to independent claims 11 and 16, respectively.

**VII. CONCLUSION**

Applicant respectfully submits that the present application is in immediate condition for allowance. If there are any questions or concerns, the Examiner is invited to contact the undersigned attorney at 512-536-3187.

Respectfully submitted,



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